

5.0 CUMULATIVE IMPACTS

Impacts from Proposed Action. The Proposed Action would add a new approximately 1 MW geothermal power plant and a direct-use application to heat water for fish tanks at the AmeriCulture fish hatchery. The AmeriCulture site currently uses a downhole heat exchanger in a geothermal well to heat freshwater for the hatchery operations. The addition of the proposed power plant and direct-use application would allow AmeriCulture to operate with less energy (electricity) costs.

The impacts of the Proposed Action include disturbance of 9.3 acres (3.8 ha) of land, 2.7 acres (1.1 ha) of which is land disturbed only by grazing activities. The new pipeline to the new injection well would cross over the shallow dry wash to the north of the project site. The injection water pipeline would be built on blocks or post to allow for thermal expansion and contraction of the pipe. Since the area is so flat and the wash becomes indistinguishable from sheetflow features just to the west, the small amount of temporary effects to the wash during vehicle crossings would be minor. The impacts to biological resources would be minor and not expected to adversely affect any plant or animal populations or communities. No historic properties or other significant cultural resources are present in the areas that would be disturbed. The current land use around the AmeriCulture site, a mix of grazing, commercial/light industrial, and residential, would not change.

The air quality would be slightly affected by the Proposed Action by exhaust emissions during construction; minor intermittent emissions of ammonia from the turbines and during deliveries; and small amounts of hydrogen sulfide and carbon dioxide released from the injection well. The turbine and cooling fans at the proposed power plant would be the largest source of long-term noise. The nearest human receptor would experience an increase in noise levels from around 50 dBA to a level as high as 70 to 80 dBA. The visual impacts of the proposed power plant facilities from the neighboring residence would include direct sight of the turbine-generator and cooling tower skids and the steam plume. From the viewpoint of NM 338, the addition of a second steam plume close to the first one would result in very minor impact to visual resources from this viewpoint.

The AmeriCulture facilities currently use 50 gpm (190 lpm) of freshwater. The Proposed Action would involve a 300 percent increase in the use of freshwater by AmeriCulture. This increase would be supplied from an additional freshwater well.

The Proposed Action would involve pumping approximately 1,000 to 1,200 gpm (approximately 3,800 to 4,500 lpm) of 232°F (111°C) geothermal fluid from the subsurface geothermal resource. The drawdown at the well was calculated to be approximately 60 ft (18 m) after 20 years of continuous pumping. Continuous pumping of Burgett “B” State well at 1,000 gpm (approximately 4,000 lpm) for 20 years could result in an additional 30 ft (approximately 9 m) drawdown at the AmeriCulture State 1 well. The construction of the AmeriCulture State 1 well and the existing nearby production wells appear adequate to tolerate the drawdowns that would result from withdrawal of geothermal waters at AmeriCulture. Therefore, it appears that the portion of the Lightning Dock KGRA in the vicinity of the AmeriCulture facility would likely be able to supply power to the AmeriCulture facility without substantially degrading the capacity of the resource in the long term.

The cooling tower blowdown water would be mixed with the spent geothermal water and reinjected into the geothermal aquifer where the groundwater temperature would match that of the geothermal water/blowdown water mixture. Impacts to the temperature and quality of the water in the Lightning Dock KGRA resulting from injection are therefore anticipated to be negligible.

The electrical power from the proposed power plant would be used by AmeriCulture. The amount of power from Columbus Electric (the local utility) consumed by AmeriCulture would be reduced to zero. It is anticipated that the power generated by the proposed power plant would be in excess of AmeriCulture's current power needs. Current plans are to sell the excess power to Columbus Electric, a member of Tri-State.

The Federal involvement in partial funding of the proposed power plant, injection well, pipelines and related facilities would result in some temporary employment but would not require permanent additions to the current workforce. The Proposed Action would not result in any major socioeconomic changes.

Other Projects in the Area. The largest single greenhouse operation in the United States is a neighbor to the proposed project. Burgett Geothermal Greenhouses, Inc., grows cut roses using the heat and power generated from the Lightning Dock geothermal resource. The Burgett greenhouse operation was included in the assessment of the existing environment.

Other DOE offices have provided initial partial funding for two other projects in the Lightning Dock KGRA. The first action involves drilling wells into the deep part of the geothermal resource where limited fluid is present, injecting water into one well, and collecting heated fluid at a nearby well (See Appendix C). If this project proves successful, DOE would consider providing additional funding for construction of a power plant using that geothermal resource, which is deeper than the resource that would be utilized by the Exergy/AmeriCulture project. The proposed system would involve limited removal of fluid from the deeper reservoir.

The second action proposes to develop a 6 MW "combined technologies project" where two geothermal systems would be used to provide heated fluid to generate power. A typical intermediate-depth geothermal system at a depth of 1,200 to 3,000 ft (360 to 900 meters) and a deeper system at 3,000 to 4,000 ft (900 to 1,200 meters) where water would be injected into the hot rock to be heated and extracted at a nearby well. Initial phases of work on these projects are being conducted to determine their technical feasibility. DOE will consider providing additional funding for these projects pending the outcome of the feasibility determination.

Two electrical power plants are planned for development in the region of the Proposed Action. Neither of these power plants is planned to use geothermal resources. Tri-State plans to build a 142 MW gas-fired peaking power plant near Lordsburg. Construction is expected to start in 2002, with operations beginning in 2003. Construction would require 175 jobs, while operation would require up to 4 full time employees.

The Public Service Company of New Mexico plans to increase its generating capacity in southern New Mexico by building an 80-MW gas-fired power plant near Lordsburg. Construction is set to begin in January 2002 and operations to begin in July 2002. The capacity would be used to meet the needs of the Public Service Company of New Mexico customers and

excess would be sold on the wholesale market (Journal 2002). An estimated 200 to 300 construction jobs would be involved, but only 6 full time employees.

Irreversible and Irretrievable Commitment of Resources. This section describes the major irreversible and irretrievable commitments of resources that can be identified at the level of analysis conducted for this EA. A commitment of resources is irreversible when its primary or secondary impacts limit the future options for a resource or limit those factors that are renewable only over long periods of time. Examples of nonrenewable resources are minerals, including petroleum, and cultural resources.

An irretrievable commitment of resources refers to the use or consumption of a resource that is neither renewable nor recoverable for use by future generations. Examples of irretrievable resources are the loss of production, harvest, or recreational use of an area. While an action may result in the loss of a resource that is irretrievable, the action may be reversible. For instance paving over farmland results in the irretrievable loss of harvests from that land. However, the parking lot could be removed and crops grown again. Hence, the action is reversible.

The construction and operations of the proposed power plant and the direct use application at AmeriCulture would require the irreversible and irretrievable commitment of building materials.

The cooling water used by the proposed power plant would be a minor irretrievable consumption of water. Up to 100 gpm (approximately 380 lpm) of freshwater would be used in the cooling tower. Some would be reinjected, however, the remainder would be lost through evaporation. The use of the geothermal water and heat represent a larger irretrievable impact to the geothermal resource. However, the same amount of geothermal fluid used will be reinjected and the resource's heat production potential greatly exceeds the proposed use. Both the geothermal fluid and heat would likely recover soon after the proposed use by AmeriCulture ceased.

Relationship Between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity. The actual construction of the proposed power plant and direct use application at AmeriCulture would result in the short term disturbance of the ground immediately surrounding the location of the wells, pipelines, and power plant skid. The operation of the power plant and direct use require short-term use of freshwater, geothermal fluid, and heat. The power provided by the proposed action would cause overall enhancements of the long-term productivity of the AmeriCulture operations. While causing some short-term disruption and use of resources, the information gained from the operation of the power plant would provide for long-term improvement of knowledge of the geothermal resource and the feasibility of small-scale low-temperature geothermal power plants.

